

AMENDMENTS TO THE DRAWINGS

The attached sheets include changes to Figures 8C, 16C, and 17C to correct reversed designations of coils.

Attachment: Replacement Sheet(s)

REMARKS/ARGUMENTS

In response to the Office Action mailed April 4, 2005, Applicants amend their application and request reconsideration. No claims are cancelled and new claims 20-22 are added so that claims 1 and 3-22 are now pending.

Three replacement drawing sheets are attached for approval. Only Figures 8C, 16C, and 17C include changes. The erroneous designation of coils L1 and L2 is corrected by interchanging those designations and an obvious error in designating corresponding fluxes is corrected. No new matter is added in the specification and drawing corrections.

An obvious error in the paragraph modified in the previous response is corrected here. In addition, minor errors at page 33 of the specification are corrected.

In this Amendment new claims 20-22 are added, claim 21 being a second independent claim. The newly added claims are consistent with the species election previously made and therefore must be examined. In addition, minor amendments for clarity are made with respect to two claims, claims 3 and 4. These amendments do not affect the substance of those claims.

With regard to the species election requirement and the election made, claim 1 remains a generic claim as to claims 3-20. Upon allowance of that claim 1, claims 5, 8-10, 12, and 18 must be rejoined to the prosecution and also allowed pursuant to 37 CFR 1.141.

Newly added claim 20 specifies that the first magnetic circuit does not include the permanent magnet. This claim is supported in the description from page 14, line 18 to page 15, line 5, in conjunction with Figure 8B.

New claim 21 claims in a way different from claim 1 the magnetic actuator that is described in the present patent application. New claim 21 describes the first yoke as including a holding part which holds the armature. Referring to Figure 3A, for example, the armature 2 is held by the horizontal parts 1a and 1b of the first yoke 1. By holding, it is meant that the armature is restrained within the first yoke by those parts of the first yoke. In addition, in the cited figure and other figures pertaining to the elected embodiment, the armature includes a shaft that passes through those holding parts of the first yoke. Further, according to new claim 21, the first yoke 1 includes an end face, for example end face g of Figure 3A, that faces the armature 2. Further it can be seen that the first yoke 1 extends continuously from the end face g to both of the holding parts 1a and 1b of the first yoke 1. This extension or extending part passes around the circumference of the coil 3 or the coil 4 in the embodiment of Figure 3A. In addition, as most easily seen in Figures 1A and 1B, the second yoke includes a mounting part 5 that is attached to the first yoke 1 and a central portion that is a connecting part connected to the permanent magnet 6. As explained in new claim 22, that second yoke is attached to a surface of the first yoke 1 and that surface of the

first yoke lies in a plane perpendicular to the direction of lamination of the metal sheets of the first yoke 1.

Claims 1, 3, 4, 7, 11, 13-17, and 19 were rejected as obvious over Cereda et al. (U.S. Patent 6,084,492, hereinafter Cereda) in view of McKean et al. (U.S. Patent 6,009,615, hereinafter McKean). This rejection is respectfully traversed.

According to the description of the Office Action, Cereda fails to describe the actuator of claim 1 because Cereda does not describe the yokes as being formed of laminations. Thus, according to the Office Action, every other part of claim 1 is described by Cereda. This assertion is incorrect.

In the magnetic actuator of Cereda, as described by the Examiner, two yokes 10 and 20, each having, in the depiction of Figure 1 of Cereda, the shape of the letter E, correspond to the first and second yokes of claim 1. The central parts of those yokes 10 and 20 each include a permanent magnet, 6 and 7, respectively. With the exception of the split yoke in Cereda, this structure is identical to the prior art actuator of Figures 17A-17C of the present patent application.

As shown in those prior art figures of the present patent application, the two permanent magnets that face the armature are oriented so that like-polarity poles of the magnets face each other. As well known in the art, this arrangement is essential to achieve the purpose of the permanent magnets, namely holding the armature in whichever position the armature is located in the absence of the excitation of the coils 207 and 208. In other words, there is a repulsion force between these two magnets. If one of the two magnets were oriented differently so that there were an attractive force between the two permanent magnets, then the armature 206 would be attracted toward one of the magnets. In that case, the armature would not remain aligned along the axis of movement of the armature, potentially resulting in binding where the armature support passes through the single yoke of the prior art actuator. To avoid that undesired result, in the prior art actuator illustrated in the present patent application, and in the similar prior art actuator described by Cereda, the permanent magnets are aligned with like-polarity poles facing each other on opposite sides of the armature.

Because of the arrangement of the permanent magnets, as illustrated in prior art Figure 17A of the patent application, the flux of the two permanent magnets passes along paths as shown in that figure. Moreover, the flux from the two magnets does not overlap within the armature because of the orientation of the permanent magnets with their mutually repulsive magnetic fields and resulting fluxes. As shown in prior art Figure 17A of the present patent application, the two magnetic circuits, through which the flux generated by the respective permanent magnets flows, pass through the armature, the respective permanent magnet, and the single yoke 203. The same flux paths are established, although not described

nor drawn, in the magnetic actuator shown in Figure 1 of Cereda. The difference between the magnetic circuits shown in Figure 17A of the present patent application and the magnetic circuits that would be established in the actuator shown in Figure 1 of Cereda relate only to the splitting of the yoke in Cereda. There is, in Cereda, one magnetic circuit from the flux generated by the permanent magnet 6 that would extend through that permanent magnet, the first yoke 10, and the armature 3. A second magnetic circuit would be the mirror image of the first magnetic circuit and would be defined by the flux generated from the second permanent magnet 7. That second magnetic circuit would include flux passing through the second permanent magnet 7, the armature 3, and the second yoke 20.

Given an understanding of the magnetic actuator described by Cereda, a comparison can be made between claim 1 and the magnetic actuator of Cereda. While there are similarities between Cereda's magnetic actuator and the magnetic actuator of claim 1, it is apparent that neither of the permanent magnets 6 and 7 of Cereda generates a flux that passes through a magnetic circuit including that permanent magnet, the armature and *both of* the first and second yokes. No magnetic circuits based upon the flux generated by either of Cereda's permanent magnets 6 and 7 can ever pass through both of Cereda's first and second yokes 10 and 20. Therefore, even if Cereda's yokes 10 and 20 are made from laminated metal sheets, based upon the citation of McKean, all of the elements of claim 1 are not present in Cereda for want of the second magnetic circuit. For that reason, *prima facie* obviousness of that claim has not been established and the rejection should be withdrawn.

It follows that Cereda, even in combination with McKean, cannot suggest any of dependent claims 3, 4, 7, 11, 13-17, and 19.

Claim 6 was rejected as unpatentable over Cereda in view of McKean, to the extent the rejection is understood, and further in view of Guery et al. (U.S. Patent 4,635,016, hereinafter Guery). This rejection is respectfully traversed because even if Guery should supply the limitation of claim 6, a point not conceded by the applicants, Guery fails to disclose the arrangement of the first magnetic circuit as in amended independent claim 1 and, therefore, could not, in any combination with Cereda and McKean, suggest the claimed invention.

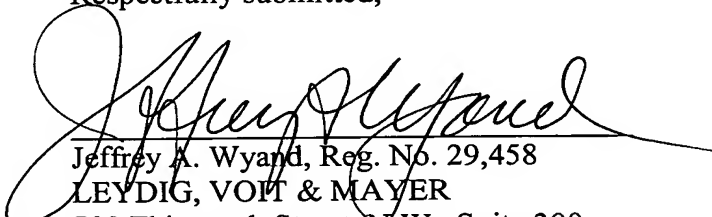
New independent claim 21 describes the particular mechanical structure of the first yoke which includes the holding part and the extending part which extends from an end face, that faces the side face of the armature, to the holding part. It is clear by basic inspection of Cereda that the split yoke structure of Cereda cannot meet this description. There is no corresponding holding part in the yoke of Cereda because that overall yoke 1 is actually composed of two "core" parts 10 and 20 that are joined by respective inserts 50 and 51 of non-ferromagnetic material. See Cereda at column 4, lines 1-5. Since Cereda lacks part of the structure of the first yoke described in new claim 21, it cannot anticipate that claim.

Moreover, although McKean depicts a first yoke that may be considered to include a holding part, since the McKean yoke is not split, one cannot modify Cereda with McKean in a way consistent with the rejection that would justify the rejection of claim 21.

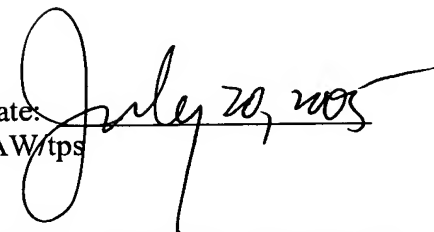
New claim 22 describes the magnetic actuator as including a second yoke with a permanent magnet and attached to the first yoke on a surface perpendicular the armature. Further, that surface is perpendicular to the direction of lamination of the metal sheets of the first yoke. Clearly, if the first and second yokes of Cereda are made of laminated metal sheets, the direction of lamination is perpendicular to the paper including Figure 1 of Cereda. No surface of the permanent magnets 6 and 7 or a second yoke facing the actuator 3 is perpendicular to that lamination direction. Rather, those surfaces are parallel to that lamination direction. Similarly, the magnetic actuator shown in Figure 1 of McKean includes permanent magnets 30 and a putative first yoke oriented in precisely the same way as the corresponding elements of Cereda. Therefore, the magnetic actuator in claim 22 is likewise patentably distinct from Cereda and McKean taken together or separately.

Upon reconsideration, the rejection should be withdrawn with regard to the examined claims, the withdrawn claims should be rejoined to the prosecution, and all of the pending claims, claims 1 and 3-22, should be allowed.

Respectfully submitted,



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Date: 
JAW/tps

Amendment or ROA - Regular (Revised 4-18-05)